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on May 22, 2006 (Date of Deposit)

Mark Watson — Mark Watson
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OIPE IAP100 MAY 30 2006 PATENT & TRADEMARK OFFICE

Application No.	:	**09/970,144**
Confirmation No.	:	**2134**
Applicant	:	**HERLEY, Cormac**
Title	:	**TEXT DOCUMENT CAPTURE WITH JITTERED DIGITAL CAMERA**
Filed	:	**October 3, 2001**
TC/A.U.	:	**2621**
Examiner	:	**LAVIN, Christopher L.**
Docket No.	:	**MCS-027-04 (183200.01)**
Customer No.	:	**27662**

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REPLY BRIEF UNDER 37 CFR 41.41(a)(1)

Sir:

This Reply Brief is in response to the Examiner's Answer dated March 22, 2006.

I. STATUS OF CLAIMS

a. Claims 1-8, 11-20, 22-29 and 31-33 represent all claims currently pending in the application.

b. Claims 1-8, 11-20, 22-29 and 31-33 are rejected.

c. The rejection of claims 1-8, 11-20, 22-29 and 31-33 is hereby appealed.

II. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

a. Independent claim 1 was rejected under 35 U.S.C. §103(a) as being unpatentable over Crinon, et al. (U.S. Patent 6,285,804, hereinafter "***Crinon***"), in view of Steinkirchner (U.S. Patent 5,392,365, "***Steinkirchner***"). The rejection of claim 1 is appealed.

b. Independent claim 13 was rejected under 35 U.S.C. §103(a) as being unpatentable over ***Crinon*** in view of ***Steinkirchner***. The rejection of claim 13 is appealed.

c. Independent claim 25 was rejected under 35 U.S.C. §103(a) as being unpatentable over ***Crinon*** in view of ***Steinkirchner***. The rejection of claim 25 is appealed.

d. Independent claim 33 was rejected under 35 U.S.C. §103(a) as being unpatentable over ***Crinon*** in view of ***Steinkirchner***. The rejection of claim 33 is appealed.

III. ARGUMENT:

a. Reply to Examiner's Response to Arguments with Respect to Claim 1:

As discussed in further detail below, in Section (10) of the Examiner's Answer dated April 22, 2006, the Examiner incorrectly summarizes the Appellant's arguments by partially quoting selected portions of the Appellant's argument and drawing incorrect conclusions from those partially quoted arguments. The Examiner then incorrectly suggests that the Appellant is attempting to use the word "function" in the claimed language to mean "a mathematical term, in this case, an equation." As discussed in further detail below, both of these points are incorrect and introduce errors into the arguments presented by the Examiner.

In particular, the Examiner incorrectly suggests that the Appellant's primary argument is that the language "as a function" distinguishes over the ***Crinon*** reference with respect to the claimed element:

> "forming from the multiple laterally displaced images an enhanced resolution representation of the text document ***as a function of the fractional pixel offset positions***"

In making the aforementioned argument, the Examiner first suggests that the term "function" typically means "based on," and that the Appellant is attempting to use that term as meaning "an equation" for purposes of differentiating over the ***Crinon*** reference. However, in contrast to the position advance by the Examiner, Appellant is clearly using the term "as a function" to mean "based on" as is the commonly accepted definition (as admitted by the Examiner.) In fact, the Appellant has never suggested, either in the specification, or in any response presented in reply to prior Office Action received in this case that Appellant intended to construe the term "as a function" in the manner suggested by the Examiner.

The Examiner then continues by arguing that "Crinon clearly creates an enhanced resolution image from low-resolution images 'based on' inter-pixel, i.e., fractional pixel, offset positions." The Examiner then offers col. 5, lines 28-59 of the ***Crinon*** reference in support of this position, and partially quotes the Appellant's prior argument as supporting the Examiner's position.

In particular, the Examiner selectively quotes the following from the Appellant's prior argument as follows:

> "unlike the ***Crinon*** reference, rather than computing global motion models, deriving motion vectors from the motion model for relating a reference image to every other image, mapping image pixels to "inter-pixel positions" which are in turn used to map pixel intensities to "high-resolution grid points,"

The Examiner then erroneously concludes from this one partial quote that the "applicant also believes that Crinon creates an enhanced resolution image from low-resolution images 'based on' fractional pixel offset positions." The Appellant does ***not*** believe that ***Crinon*** creates an enhanced resolution image from low-resolution images based on fractional pixel offset positions, and has made no such admission.

In particular, in stark contrast to the position advanced by the Examiner, and as fully explained in the Appellant's prior responses, ***Crinon*** explains the following processes (see col. 3, lines 41 to col. 4, line 35, and claims 1 and 9 of the ***Crinon*** reference) for use in creating enhanced resolution images:

1. ***Crinon*** first estimates parameters of a "global motion model" by estimating motion models ***between a reference image and every other image*** in a set of low resolution images;

2. ***Crinon*** then uses this global motion model to derive "motion vectors" for every pixel in the set of low resolution images relative to the "reference image";

3. ***Crinon*** then uses these ***motion vectors to map*** high resolution grid points onto the low resolution images to form a set of mapped "inter-pixel positions" on each low resolution image;

4. ***Crinon*** then identifies one or more "low-resolution pixels" from each low resolution image having a "closest spatial distance" to the identified "inter-pixel positions";

5. ***Crinon*** then evaluates these identified "low-resolution pixels" to select those pixels having a "shortest distance" relative to the "high-resolution grid points"; and

6. ***Crinon*** maps intensity values of those selected "low-resolution" pixels into the corresponding "high-resolution grid points."

In other words, ***Crinon*** does ***not*** create an enhanced resolution image from low-resolution images based on fractional pixel offset positions. In fact, ***Crinon*** clearly creates the enhanced resolution image from a motion model-based mapping of grid points overlaying a set of low resolution images and uses this grid-point overlay to select particular pixels from the low resolution images, with pixel intensity values of those selected pixels then being mapped back to the high resolution grid points.

Clearly, Appellants are not describing or claiming the ***motion-model-based pixel mapping*** described by Crinon. In fact, Appellant constructs high resolution images, as described and claimed, directly from the pixels ***based on*** (i.e., "as a function of") fractional pixel offset positions ***without the need to compute the motion models*** (i.e., the "global motion model" which is in turn used to derive "motion vectors") described by ***Crinon***.

For example, as described by the Appellant in paragraph [0048]:

> "[0048] ***One implementation of determining each enhanced resolution pixel employs a weighted combination of multiple (e.g., 3) image pixel samples that are nearest the enhanced resolution pixel.*** As shown in FIG. 6, the value PE of an enhanced resolution pixel 110 may be ***calculated as a weighted sum of the image values S_A, S_B, and S_C of the three nearest image pixel samples*** 112A, 112B, and 112C:
>
> $P_E=W_AS_A+W_BS_B+W_CS_C$"

In the above example, the Appellant provides a weighted combination of pixel samples to form composite pixels for an enhanced resolution image. In other words, the enhanced resolution pixels are determined ***based on*** (i.e., "as a function of") fractional pixel offset positions. Further, in contrast to the position advanced by the Examiner, the above cited equation does ***not*** "closely mirror the equation Crinon teaches" as the Appellant does ***not*** use a "global motion model" and "motion vectors" to select pixels used for constructing composite pixels.

Clearly, the process for generation of high resolution images that is described and claimed by the Appellant is vastly less complicated than the process described and claimed in the ***Crinon*** reference. In fact, the ***Crinon*** reference ***requires*** steps that are ***not used*** in the Appellants claimed invention. As such, the ***Crinon*** reference does ***not*** disclose the Appellant's claimed system for "forming from the multiple laterally displaced images an enhanced resolution representation of the text document ***as a function of the fractional pixel offset positions***." Further, the Appellant respectfully suggests that broadening the interpretation of the language of claim 1 to encompass the teachings of the ***Crinon*** reference are clearly unreasonable in light of the clear discussion of both the Appellant's specification and the discussion provided in the ***Crinon*** reference.

Further, as discussed above, ***Crinon*** discloses the use of ***motion vectors*** to map high resolution grid points onto the low resolution images ***to form a set of mapped "inter-pixel positions"*** on each low resolution image. In stark contrast, Appellant describes and claims "determining fractional ***pixel offset positions at which each image was obtained***." Clearly, a fractional pixel offset at which an image was obtained, as disclosed by the Appellant, is ***not*** the same as a fractional pixel offset corresponding to a high resolution grid point mapped to an image as a function of a motion vector estimated from global motion model, as disclosed by ***Crinon.***

Thus, it is clear that the present invention, as claimed by independent claim 1 includes elements not taught in the proposed ***Crinon*** - ***Steinkirchner*** combination reference. Consequently, the rejection of independent claim 1, and thus of dependent claims 2-8 and 11-12, under 35 U.S.C. §103(a) is not proper. Therefore, the Appellant respectfully requests traverses the rejection of claims 1-8 and 11-12 under 35 U.S.C. §103(a) in view of the novel language of claim 1, and respectfully requests reconsideration of the rejection of those claims. In particular, claim 1 recites the following novel language:

> "A text document capture method for digitizing a text document segment in printed form, comprising:
>
> imparting a ***continuous lateral jittering*** between a digital imaging device and the text document;
>
> obtaining multiple laterally-displaced digital images of all of the text document segment ***during the continuous lateral jittering and determining fractional pixel offset positions at which each image was obtained***;
>
> forming from the multiple laterally displaced images an enhanced resolution representation of the text document ***as a function of the fractional pixel offset positions***; and
>
> de-blurring the enhanced resolution representation of the text document by thresholding the enhanced resolution representation into either one of two pixel luminance levels, representing foreground and background

pixels, with the foreground pixels corresponding to text in the text document." (emphasis added)

b. **Reply to Examiner's Response to Arguments with Respect to Claim 13:**

The Examiner's arguments for claim 13 are the same as claim 1. Consequently, rather than repeating the detailed arguments presented above with respect to the rejection of claim 1, those arguments are incorporated by reference into the arguments for the patentability of claim 13.

c. **Reply to Examiner's Response to Arguments with Respect to Claim 25:**

The Examiner's arguments for claim 25 are the same as claim 1. Consequently, rather than repeating the detailed arguments presented above with respect to the rejection of claim 1, those arguments are incorporated by reference into the arguments for the patentability of claim 25.

d. **Reply to Examiner's Response to Arguments with Respect to Claim 33:**

The Examiner's arguments for claim 33 are the same as claim 1. Consequently, rather than repeating the detailed arguments presented above with respect to the rejection of claim 1, those arguments are incorporated by reference into the arguments for the patentability of claim 33.

IV. CONCLUSION:

In view of the preceding discussion, and in view of the arguments presented in the Appeal Brief, which are incorporated herein by reference, it should be clear that the arguments presented by the Examiner are not supported by the cited references. As such, it should also be clear that the Examiner has failed to present a prima facie case of obviousness under 35 U.S.C. §103(a) as per claims 1-8, 11-20, 22-29 and 31-33. For the above reasons, it is believed that the rejections of claims advanced in the final office action should be vacated.

Respectfully submitted,

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